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Notice of Allowability

Application No.

10/808,849

Examiner

Davienne Monbleau

Applicant(s)

TOBIASON ET AL.

Art Unit

2878

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the examiner's amendment entered on 2/16/06.
2. ☒ The allowed claim(s) is/are 1-27.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date 11/22/04
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

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EXAMINER'S AMENDMENT AND STATEMENT OF REASONS FOR ALLOWANCE

Information Disclosure Statement

The IDS filed on 11/22/04 has been acknowledged and a signed copy of the PTO-1449 is attached herein.

Drawings

The drawings were received on 3/18/05. These drawings are accepted.

Examiner's Amendment

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Shoko Leek on 2/16/06.

The application has been amended as follows:

REPLACE CLAIM 1 with:

Claim 1. A position measuring device usable for measuring a relative position between the position measuring device and a target member, the position measuring device comprising:

an array detector;

an optical path array element comprising a plurality of similar optical path elements that each provide an input and an output for light rays, wherein the optical path elements are arranged

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such that their inputs are arranged along two dimensions corresponding to an input face of the optical path array element and their outputs are arranged along two dimensions corresponding to an output face of the optical path array element; and

an angular filter portion that only transmits respective light rays outputted from the optical path array element along a respective operable direction that is approximately parallel to an optical axis of the angular filter portion,

wherein:

the position measuring device is positionable to provide an image on the array detector that corresponds to at least a portion of the target member, the image arising from the transmitted light rays;

and the image on the array detector is usable to determine at least one measurement value that corresponds to at least one degree of freedom of the relative position between the position measuring device and the target member.

REPLACE CLAIM 26 with:

Claim 26. A position measuring device usable for measuring a relative position between the position measuring device and a target member, the position measuring device comprising:

an array detector;

an optical path array element comprising a plurality of similar optical path elements that each provide an input and an output for light rays, wherein the optical path elements are arranged

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such that their inputs are arranged along two dimensions corresponding to an input face of the optical path array element and their outputs are arranged along two dimensions corresponding to an output face of the optical path array element, the optical path array element positionable to input image light from the target member; and

an angular filter portion having an optical axis, the angular filter portion positioned to receive output image light from the optical path array element and having direction-selecting characteristics such that it is operable to transmit only light rays of the output image light that are approximately parallel to its optical axis to form an image corresponding to at least a portion of the target member on the array detector,

wherein:

the target member includes at least one respective target feature;

the image corresponding to at least a portion of the target member on the array detector includes at least one respective image feature corresponding to a respective target feature;

each respective image feature corresponding to a respective target feature is defined by a set of light rays of the input image light that enter a respective set of optical path elements that are effectively direction-selected relative to the respective target feature, based at least partly on the direction-selecting characteristics of the angular filter portion; and

for at least one respective target feature at least one of a size and a position of the corresponding respective image feature on the array detector is usable to determine at least one measurement value for the respective target feature, the at least one measurement value corresponding to at least one translational degree of freedom of the position measuring device position relative to the at least one respective target feature.

Allowable Subject Matter

Claims 1-27 are allowed in view of the examiner's amendment incorporated herein.

The following is an examiner's statement of reasons for allowance:

Regarding claims 1-25, the cited prior art of record does not teach or fairly suggest a position measuring device comprising, along with the other claimed features, an optical path array element comprising a plurality of similar optical path elements that each provide an input and an output for light rays, wherein the optical path elements are arranged such that their inputs are arranged along two dimensions corresponding to an input face of the optical path array element and their outputs are arranged along two dimensions corresponding to an output face of the optical path array element, and an angular filter portion that only transmits respective light rays outputted from the optical path array element along a respective operable direction that is approximately parallel to an optical axis of the angular filter portion.

Regarding claims 26-27, the cited prior art of record does not teach or fairly suggest a position measuring device comprising, along with the other claimed features, an optical path array element comprising a plurality of similar optical path elements that each provide an input and an output for light rays, wherein the optical path elements are arranged such that their inputs are arranged along two dimensions corresponding to an input face of the optical path array element and their outputs are arranged along two dimensions corresponding to an output face of the optical path array element, and an angular filter portion having direction-selecting characteristics such that it is operable to transmit only light rays of the output image light that are approximately parallel to its optical axis to form an image corresponding to at least a portion of the target member on the array detector.

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Although the cited prior art of record teaches various position detecting devices comprising different lens arrangements and possibly a filter, they do not teach the combination of having a two dimensional optical path array element with a filter that selects particular output rays based on their direction path.

The advantages of these features are in the specification on pages 1-7. In particular, these feature enable an imaging array to provide high accuracy simultaneous measurements for up to 6 degrees of freedom for an object, including any one of, or combination of, X, Y, Z, yaw, pitch, and roll.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure because they teach various position detecting devices comprising an optics and filter configuration.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Davienne Monbleau whose telephone number is 571-272-1945. The examiner can normally be reached on Monday through Friday 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on 571-272-2328. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Danielle Monbleau

DNM

Stephane B. Allen
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